



Contribution ID: 7

Type: **Parallel Session Talk**

The electron-EDM in the decoupling limit of the aligned 2HDM

Tuesday 3 December 2024 18:30 (15 minutes)

We discuss model-independent contributions to the electron-EDM, focusing on those contributions emerging from a heavy scalar sector. More specifically, we investigate the aligned 2HDM in the decoupling limit. We point out that logarithmically enhanced contributions generated by Barr-Zee diagrams with a fermion loop are present in the aligned 2HDM, an effect encoded by the mixing of effective operators of dimension-6.

The same large logarithms are absent in alternative 2HDMs where a Z_2 symmetry is enforced, which thus controls the basis of effective operators. In the aligned 2HDM these contributions are proportional to sources of CP violation that are potentially large. We also discuss the role of non-dipole contact interactions in setting phenomenological constraints on the allowed amount of CP violation.

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Session Classification: Flavour and CP violation 2

Track Classification: Parallel track